

Notice of Allowability

Application No.

10/774,344

Examiner

Rip A. Lee

Applicant(s)

HAMMEN ET AL.

Art Unit

1713

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to August 15, 2006.
2. ☒ The allowed claim(s) is/are 1-16, 20-22, 24-28, 31 and 32.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

The application has been amended as follows:

Claim 1, line 3	insert "material" after the word "solid"
Claim 1, line 5	insert "material" after the word "solid"
Claim 9, line 1 [†]	replace "claim 1" with "claim 2"
Claim 9, line 1	insert "said" between the words "which" and "material"
Claim 13, line 1 [‡]	delete "grafted"
Claim 14, line 2	delete "grafted"
Claim 15, line 2	delete "grafted"
Claim 16, line 2	delete "grafted"
Claim 25, line 1	delete "grafted"
Claim 26, line 1	delete "grafted"
Claim 27, line 1	delete "grafted"
Claim 28, line 1	delete "grafted"

[†] Claim 9 was a substantial duplicate of claim 6 since the dependency was the same.

[‡] Amendment of claims 13-16 and 25-28 to remove the term "grafted" obviated lack of antecedent basis in the claim language. The limitations of the claims actually describe the functional polymer or copolymer. See also parent U.S. 6,689,715 for similar claim format.

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The specification has been amended as follows:

Insert the following continuing data between the title "TETHERED POLYMER LIGANDS" and "1. FIELD OF THE INVENTION" on page 1:

"This application is a continuation of 09/780,131, filed on February 9, 2001, now U.S. Patent No. 6,689,715, which claims benefit of U.S. Provisional Application No. 60/181,409, filed on February 9, 2000."

Allowable Subject Matter

The following is an examiner's statement of reasons for allowance: Claims 1-16 and 20-22, 24-28, 31, and 32 are allowed over the closest references cited below.

The present invention is drawn to a support comprising (i) a porous noncompressible solid material, (ii) a tether polymer covalently bound to the solid material that is amenable to grafting with other polymers, (iii) a protective polymeric surface covering that reduces nonspecific interactions of solutes with said solid material, and (iv) a functional polymer or copolymer grafted to the tether polymer and possessing useful chemical functionality.

Hammen (U.S. 5,240,602) teaches a chromatographic material having general formula S-B-X-Y-L where S is a solid support, B is a binding group, X is a non-ionic hydrophilic organic spacer, Y is a coupling group, and L is an affinity ligand. Specifically, PEG 600 is prepared by covalently binding a polyethylene glycol tether to a silica support. A crosslinked polystyrene containing a sulfonamide terminus is reacted with PEG 600, resulting in a functional polymer grafted onto the tether. This modification solves the problem of reducing non-specific adsorption of solutes and improving stability in alkaline media. While the binding group is polymeric in nature (PEG), Y and L are molecular fragments rather than polymers that are grafted to the tether, as claimed. Thus, the reference does not teach the basic architectural features of the present claims. Furthermore, the reference does not teach use of a protective polymeric surface covering that reduces non-specific interactions of solutes with said solid support. The skilled artisan would not have found it obvious to modify the invention described in Hammen in order to arrive at the subject matter of the present claims.

Fulcrand *et al.* (U.S. 6,319,674) teaches a method of immobilizing a substance to a surface by attaching one end of a hydrocarbon chain linker to the surface followed by attaching a polyalkylene oxide to the free end of the hydrocarbon linker by means of chemical reactions. The reference teaches use of trihalo- and trialkoxysilanes, *inter alia*, for derivatization of the metal oxide surface in order to attach the linker to the surface. However, Fulcrand *et al.* neither

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teaches nor fairly suggests their use as a protective polymeric surface covering that reduces nonspecific interactions of solutes with the support. Therefore, it would not have been obvious to the skilled artisan to use them as such in order to arrive at the subject matter of the present claims.

Lee *et al.* (U.S. 6,235,340) teaches preparation of biopolymer resistant coatings. A solid oxide surface such as silica is treated with oligo(ethylene glycol) terminated alkyltrichlorosilanes so that a self-assembly of monolayers are formed on the silica surface. This structural feature qualifies as the tether polymer of the instant claims. The chain end of the tether polymer may be further derivatized by reaction with functional molecules. Passivation of the silica surface with PEG to reduce non-specific interactions of solutes is contemplated. The prior art does not teach grafting of a functional polymer or copolymer to the tether polymer, as recited in the instant claims. It would not have been obvious to the skilled artisan to modify the teaching of Lee *et al.* in order to arrive at the subject matter of the present claims.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rip A. Lee whose telephone number is (571)272-1104. The examiner can be reached on Monday through Friday from 9:00 AM - 5:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached at (571)272-1114. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <<http://pair-direct.uspto.gov>>. Should you have questions on the access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).

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November 13, 2006


LING-SUI CHOI
PRIMARY EXAMINER